Table III.—*Effect on Milk Sugar of Pancreatic Juice from "Biscuit-fed" dogs, which had received Subcutaneous Injections during three days of Extracts of the Mucous Membrane of "Milk-fed" dogs.*

The figures represent c.c. of lactose solution which reduced 50 c.c. Pavy's solution.

Exp.	Controls		Lactose+pancreatic juice	Percentage of inversion
	Solution of lactose	Lactose+pancreatic juice (boiled)		
1 ...	7·4	...	6·8	18·1
2 ...	8·2	8·2	7·6	16·5
3 ...	8·2	8·15	7·85	9·7
4 ...	7·95	7·9	7·65	8·5
5 ...	7·8	..	7·5	8·8
6 ...	7·0	7·05	6·75	8·1
7 ...	4·1	...	3·75	20·8
8 ...	9·25	...	8·2	25·9

Here then at last we have some glimpse into the mechanism of the adaptation of the pancreas to the nature of the food. As the result of injection of lactose some substance which we may call x is produced in the mucous membrane of the small intestine. This substance is carried by the blood to the pancreas, and there slowly gives rise to the formation of lactase which is turned out in the juice when secretion is excited by the entry of acid chyme into the duodenum. We have no knowledge as yet as to the nature of this substance x. All we can say is that it is destroyed at a boiling temperature, since boiled extracts of the mucous membrane of milk-fed dogs do not, when subcutaneously injected, cause the appearance of any lactase in the pancreatic juice of biscuit-fed dogs.

Whether the qualitative adaptation of the juice in respect of its trypsin, amylopsin, and steapsin is carried out in a similar fashion we cannot as yet say. We hope that an investigation of the mechanism of this adaptation, which is now proceeding, may throw light, not only on the factors involved, but also on the nature of the substance which is formed in the mucous membrane, and has this marked effect on the activity of the pancreatic cells. Involving, as it does, two distinct sets of cells, this chemical adaptation is more complex than any yet investigated, and shows the intimate relation which must exist between the chemical activities of very different organs of the body.

THE ROYAL SOCIETY CONVERSAZIONE.

THE Royal Society conversazione was held in the rooms of the Society at Burlington House on Friday last, May 13. Many exhibits illustrating methods and results of recent scientific progress were on view, and are briefly described in the following abstract of the official catalogue. So far as possible the exhibits representing related subjects are here grouped together.

In the course of the evening, lantern demonstrations were given in the meeting room of the society. Prof. W. A. Herdman gave an account of the recent investigation of the Ceylon pearl fisheries; Mr. Francis Fox showed lantern slides, illustrative of (1) operations at the Simplon Tunnel; (2) the Victoria Falls and gorge of the River Zambesi, and proposed bridge; and the Hon. C. A. Parsons, F.R.S., gave a demonstration of the auxetophone. This instrument is an air operated valve which is used for a reproducer in gramophones and phonographs, and replaces the usual reproducing diaphragm in such machines. The application of this valve to the violin was shown, selections of music, vocal and instrumental, being played on the auxetophone.

The following is a classified list of the other exhibits:—

The differentiator, a machine recording as a curve the values of the rate of change of any variable quantity which can be represented by a curve: Dr. J. Erskine-Murray. When the machine is guided along any curve it automatically traces another which represents the rate of change of the quantity represented by the first curve. Thus, if the population of a country at various dates be plotted on paper the derived curve shows the rate at which the population is increasing or decreasing at every date during the period chosen.—Twin-elliptic figures showing change of phase in one or both ellipses: Mr. Joseph Goold.—A radial area-scale: Mr. R. W. K. Edwards. A contrivance for finding the area of a plane figure by means of a transparency.

Sensitive barograph, for the study of minor variations of atmospheric pressure: Dr. W. N. Shaw, F.R.S. The instrument shows the details of comparatively rapid fluctuations of pressure such as are often indicated in the barometric diagram of the *Times*.—(1) Traces obtained from self-recording instruments sent up by means of kites, (2) self-recording instruments from which the traces were obtained: Mr. W. H. Dines. In the recording instruments designed by M. Teisserenc de Bort, the height is obtained from an exhausted aneroid box, and the temperature from a Bourdon tube. In the recording instruments designed by the exhibitor, the height is obtained from a fair sized aneroid box of thin metal containing air. A temperature correction is necessary, but the position of the pen is dependent on the elasticity of the enclosed air.—Photographs of clouds: Commander D. Wilson-Barker.—Models and photographs of large hailstones: the Royal Meteorological Society.

Photographs and diagrams illustrating solar and meteorological changes, and a series of photographs to determine the relative temperatures of the stars: Sir J. Norman Lockyer, K.C.B., F.R.S. The exhibit illustrated (1) enlarged pictures of the sun in "K" light taken with the spectroheliograph of the Solar Physics Observatory. (2) The results of a discussion of sun-spot distribution. (3) The relationship between the positions of solar prominences and the different forms of the corona. (4) The different types, and their distribution, of the short period barometric pressure variation over the earth's surface. (5) The close connection between the change of barometric pressure and rainfall. (6) Series of photographs taken with a quartz-calcite prismatic camera of 2 inches aperture and 18 inches focal length to determine the relative temperatures of stars.—The Narraburra siderite, New South Wales: Prof. A. Liversidge, F.R.S. This exhibit included photographs of the siderite, and photographs of etched sections to show the changes in the internal structure. The composition of the siderite was:—iron 88·605, nickel 9·741, cobalt 0·474, copper 0·009, phosphorus 0·429, sulphur traces, resinous matter 0·008, insoluble in HCl. 0·720=99·906. Traces of gold and of the platinum metals appeared also to be present.—Transparencies and prints in illustration of a photographic atlas of the heavens; photographed at the Royal Observatory, Cape Town, 1903–4: Mr. J. Franklin-Adams.—Ten transparencies from negatives taken with the Rumford spectroheliograph of the Yerkes Observatory by Prof. G. E. Hale and Mr. F. Ellerman: the Royal Astronomical Society.

Examples showing the application of natural colour photography to the production of lantern slides of spectra for lecture and educational purposes: Mr. E. Sanger-Shepherd. Negatives are taken through three colour filters, admitting light of the three primary colour sensations—red, green and blue-violet, in accordance with the power of the respective sensations to excite the eye. From these negatives gelatin relief prints are made upon a special film, each relief being soaked in a water-colour ink of the complementary colour to the sensation which it represents. These reliefs whilst still wet are successively applied to a mordanted gelatinised glass plate. The inks transfer to the mordanted gelatin film, and the result is a natural colour photograph, consisting of nothing but the colouring matter securely locked up in a single film of gelatin.—Colour photographs shown by spectrum colours: Sir W. de W. Abney, K.C.B., F.R.S. The ordinary three-colour photographs are shown in a triple lantern, one image being tinted by the light coming through red glass, another by that through green glass, and the third by that through blue glass. The new method substitutes spectrum colours for the three glasses, with the result that the colours on the screen are much purer and truer.—High power microscopy: Mr. J. W. Gordon. The apparatus consists of a compounding drawtube and oscillating screen, as proposed in Mr. J. W. Gordon's paper on the Helmholtz theory of the microscope, recently read before the Royal Microscopical Society. The object exhibited was a diatom (*Pleurosigma angulatum*) magnified about 10,000 diameters.—A cylindrical telescope for the rotation of images: Dr. G. J. Burch, F.R.S. This instrument consists of two cylindrical lenses with their axes of curvature parallel, fixed the sum of their focal lengths apart. Objects seen through it are not magnified, but reversed as by reflection in a mirror. If the telescope is rotated it causes the image to rotate with double the angular velocity.—Large direct vision spectroscope, with ten prisms, automatically adjustable: Mr. P. Heele.—Experiments with non-homocentric pencils: Mr. W. Bennett.—Optical testing bench: Messrs. R. and J. Beck. The bench is so designed that the optical constants of a lens and its various aberrations (chromatic, spherical, astigmatic, &c.) can be rapidly and accurately measured, and is specially adapted for using the new Hartmann system of testing either by direct vision or by photography.—Examples of photomicrography: Mr. Arthur E. Smith and Mr. Richard Kerr.

Some new phosphorescent materials: Mr. H. Jackson. Examples were shown of phosphorescent compounds of zinc, strontium, aluminium, calcium, &c., prepared to illustrate varying degrees of response to such exciting influences as violet and ultra-violet light, electric discharge, heat and friction. By varying the constitution of the compounds in the direction of increasing or diminishing their basic or acidic character the length of time during which the phosphorescent glow lasts can be increased or lessened considerably, and the property of glowing, when heated, can be made to persist apparently indefinitely.—Photographs illustrative of induced radio-activity of bacteria: Dr. Alan B. Green. Small masses of bacterial growth were exposed to the β and γ rays of 10 mg. of virtually pure radium bromide. In a large number of instances such masses when removed from the influence of the radium and placed between two thin sheets of glass, themselves not radio-active, were capable of so affecting the sensitised film of a photographic plate with which they were brought in contact, that on development in the ordinary way, the plate showed a dark area corresponding to the shape of the bacterial mass. The photo-actinic rays proceeding from the bacteria which had been exposed to radium were capable of affecting a photographic plate through a double layer of lead foil.

A method of mechanically reinforcing sounds: Mr. T. C. Porter. An ordinary "Home" Edison-Bell phonograph with the "reproducer" is used as the source of the sounds. In this instrument the roughness of the record makes a rod vibrate, and these vibrations are communicated mechanically to a thin disc of glass or mica, which in turn transmits them to the air on the side of the disc remote from the rod; the aërial disturbances are then conducted by a tube usually to a trumpet, but in this experiment the reinforcement of the sounds is obtained by the combustion of coal-gas and air. The mixed gases are led over the disc of the "reproducer" and conveyed by tubing to two convergent jets and then ignited. A further reinforcement is obtained by placing platinum foil in the flame.—Experiments on lubrication showing cavitation: Mr. S. Skinner. The lubricating fluid in the space, between a bearing and the axle working in it, is subject to conditions in which cavitation, *i.e.* the formation of vacuous spaces in the fluid, can occur. This was shown by a series of experiments, in which the deeply coloured lubricating fluid is contained between glass surfaces, and light is transmitted through the cavities.—(1) Microphone-buzzer (with partially tuned telephone) giving a nearly pure note of 2000 vibrations per second; (2) apparatus used to investigate the distribution of temperature in the field coils of electric machinery; (3) apparatus for rapid electric thermometry: the National Physical Laboratory.—(1) Vibrograph for recording vibrations photographically; (2) micro-manometer: the Cambridge Scientific Instrument Company, Ltd.—Stream gauge for indicating the rate of delivery of air or gas by a pipe: Mr. R. Threlfall, F.R.S.—(1) Stereoscopic views and specimens illustrating the construction of the Simplon Tunnel; (2) stereoscopic and other views of the Victoria Falls of the River Zambesi: Mr. Francis Fox.

Apparatus for the metrical study of stationary electric waves on spiral wires: Prof. J. A. Fleming, F.R.S. The apparatus exhibited consists of a long solenoid of silk-covered wire having 5000 turns and a total length of 643 metres. This solenoid has parallel to it an adjustable earth wire and a divided scale. The solenoid is connected to one point on an oscillatory electric circuit consisting of a couple of Leydens having a capacity of 0·00068 mfd. and an adjustable inductance of 0 to 230 microhenrys and a silent discharger. When oscillations are set up in this circuit by induction coil discharges and the frequency adjusted, stationary electric waves are set up in the solenoid. The position of the loops and nodes is ascertained by the use of a series of carbonic dioxide vacuum tubes.—Edison's secondary battery (or accumulator) for automobiles: Mr. W. Hibbert and Mr. H. E. Dick.—Electrical instruments of precision: Colonel R. E. Crompton, C.B.—Improved muffle and melting furnaces for use in laboratories or art studios: Mr. H. H. Cunynghame, C.B. The plan on which these furnaces are constructed is to jacket them thickly with non-conducting material, in such a way that heat cannot escape as fast as it is developed, until a high temperature has been attained.—Electric resistance furnaces for laboratory use: Mr. Bertram Blount.

Specimens illustrating the action that occurs between metals at a temperature many hundreds of degrees below their melting point: Mr. Sherard Cowper-Coles.—Apparatus for determining the ignition point of gases: Prof. H. B. Dixon, F.R.S., and Mr. G. W. A. Foster.—Specimens of methyl and other derivatives of sulphur, selenium and tellurium: Dr. A. Scott, F.R.S.

(1) A new natural order of plants, the Amphipterygiaceæ, Hemsley and Rose; (2) fruits of *Melocanna bambusoides*, an exalbuminous, viviparous bamboo; (3) *Hydnophytum longifolium* (Rubiaceæ), Fiji Islands; (4) *Dischidia rafflesiana* (Asclepiadaceæ), Malaya; (5) *Aspidium anomalum*, Ceylon: the Director, Royal Botanic Gardens, Kew.—(1) Specimens illustrative of cotton cultivation in British colonies and dependencies; (2) map showing the "cotton belt" and the British and foreign areas in which cotton is now commercially or experimentally cultivated (from Prof. Dunstan's report on cotton cultivation in the British Empire and Egypt); (3) mineral and rock specimens from Ceylon and southern Nigeria; (4) specimens of the seeds of *Hevea brasiliensis* (Para rubber tree) from the Straits Settlements: Prof. Wyndham R. Dunstan, F.R.S., director of the Imperial Institute.—Microscopic slides illustrating nuclear division in cells of malignant growths of man: Prof. J. B. Farmer, F.R.S., Mr. J. E. S. Moore and Mr. C. E. Walker.—Microscopic preparations illustrating the parasitism of the rust fungi or Uredineæ: Prof. H. Marshall Ward, F.R.S.—Microscopical preparations to show the fertilisation and alternation of generations in the Uredineæ: Mr. V. H. Blackman.—Plants and photographs from the High Andes of Bolivia and Peru: Mr. A. W. Hill.—A series of hybrid wheats illustrating Mendel's laws: Mr. R. H. Biffen.

The pearl-oyster fisheries of Ceylon: Prof. W. A. Herdman, F.R.S.—Microscopical preparations and diagrams of the chromatophores of the higher Crustacea: Mr. Frederick Keeble and Mr. F. W. Gamble. The coloration of such Crustacea as *Hippolyte varians* is due to pigments contained in chromatophores. The chromatophores consist of several compartments, in each of which a single pigment is present. When contracted to the centre of the chromatophore, a pigment plays no part in the coloration of the animal; when expanded into the superficial network which communicates with the centre, the pigment takes a share in the coloration.—Ticks and tick-transmitted diseases: Dr. G. H. F. Nuttall, F.R.S. The exhibit included specimens of ticks which transmit several diseases; also specimens of the parasites and figures.—Nematocysts of Æolids: Mr. G. H. Grosvenor.—International North Sea investigations. Results of work during 1903, from the Plymouth and Lowestoft laboratories: the Marine Biological Association.

A photographic study of the English skull, 1600–1850: Prof. Karl Pearson, F.R.S. The photographs of English skulls illustrated normal and abnormal types. There were two series, numbering upwards of 500 altogether, from old plague pits or graveyards in the City of London. Both series were of great interest, and the nearest related group to one of them appears to be long barrow British.—Apparatus and methods employed for measuring, in the case of human blood, its content in agglutinating substances, bactericidal substances, red blood corpuscles, albuminous substances, calcium salts, and salts generally: Dr. A. E. Wright.—(1) Wax model of the marmoset's brain; (2) sections from which the wax model was constructed: Mr. Gustav Mann.

(1) Colour printed geological maps; (2) geological model of the Isle of Purbeck: the director of the Geological Survey and Museum.—Models illustrative of mountain building: Lord Avebury, F.R.S.—(1) A set of lantern slides of microscopic sections of igneous rocks, &c.; (2) portable sounding machine for mountain lakes: Prof. E. J. Garwood. —Series of geological and other drawings and plans: Prof. J. P. O'Reilly.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

Cambridge.—In connection with the approaching international assembly of representatives of academies, it is proposed to confer the degree of Doctor of Science *honoris causa* on Prof. Bakhuyzen, of Leyden; Dr. Faminstyn, of St. Petersburg; Dr. Mojsisovics von Mojsvár, of Vienna; Prof. Retzius, of Stockholm; Prof. Riecke, of Göttingen; and Prof. Waldeyer, of Berlin; and the degree of Doctor of Letters *honoris causa* on Count de Franqueville, of Paris; Prof. Goldziher, of Budapest; Prof. Gomperz, of Vienna; Prof. Krumbacher, of Munich; Prof. Leroy-Beaulieu, of Paris; and Dr. Perrot, of Paris.

Mr. W. J. Sell, F.R.S., and Mr. H. J. H. Fenton, F.R.S., are to be appointed university lecturers in chemistry, and Mr. A. Harker, F.R.S., a university lecturer in petrology.

The Senate of the Royal University of Ireland has resolved to confer, *honoris causa,* the degree of Doctor of Science on Sir William Crookes and on Prof. J. Dewar.

Science states that the New York University has received an anonymous gift of 2500*l.* for the Medical College, and that the American Geographical Society has received a bequest of 6000*l.* from Sarah M. de Vaugrigneuse.

In a paper on "Local Expenditure and Local Indebtedness in England and Wales," read by Mr. R. J. Thompson at the Royal Statistical Society on Tuesday, it was stated that education showed an increase of expenditure from 4,806,000*l.* in 1889 to a sum of nearly 11,000,000*l.* in 1902. The cost of erecting school buildings had during the same time—1889 onwards—augmented the outstanding loans from 9,937,000*l.* to 33,564,000*l.* London incurred 29 per cent. of the total expenditure, while it contributed only one-fifth of the total number of pupils.

The inauguration on February 10 of an information bureau in connection with the University of Paris is an excellent innovation. The bureau will afford information on all matters connected with higher education in Paris, whether in Government or private institutions. Those who in this country are contemplating entering a university, and who have spent hours in trying to derive some tangible ideas from calendars and class syllabuses, will appreciate the useful purpose which would be served by a bureau of this character. If such a bureau would go a little further, and furnish to candidates for chairs and lectureships some idea of the duties they would have to perform, its value will be still greater.

The President of the Board of Education, the Marquess of Londonderry, K.G., has appointed a departmental committee to inquire into the present working of the Royal College of Science, including the School of Mines, to consider in what manner the staff, together with the buildings and appliances now in occupation or in course of construction, may be utilised to the fullest extent for the promotion of higher scientific studies in connection with the work of existing or projected institutions for instruction of the same character in the metropolis or elsewhere, and to report on any changes which may be desirable in order to carry out such recommendations as they may make. Sir Francis Mowatt, G.C.B., is chairman of the committee, and Mr. J. C. G. Sykes, assistant secretary in the branch of the board which deals with evening schools, technology, and higher education in science and art, has been appointed secretary to the committee. The London County Council is represented on the committee.

A deputation consisting of representatives of various county councils was received by Sir William Anson on May 13 with reference to the abrogation of the arrangements which were in vogue under what was known as Clause 7 of the Directory of the Science and Art Department. The deputation explained that county councils had hoped when the Education Act became law that it would be recognised more fully than before that these councils were the authorities for all grades of education, including particularly higher education. But the new regulations taking the place of Clause 7 have reduced their powers, and county councils are hampered in the performance of the duties expected of them. In reply, Sir William Anson explained that Clause 7 was an attempt to bring local authorities into relations with the efforts being made to give science and art and technical teaching, assisted by the Board of Education, and limited in the first instance to institutions of a very different character from ordinary secondary schools. Local authorities are now in a position to deal with the whole of secondary education, and not merely with the subject-matter which was contemplated in Regulation 7. Sir William Anson, in conclusion, asked the deputation to consider the wider question which they should have in view in dealing with secondary education, and not merely from the point of view of exercising their own authority and the speedy transaction of their own business. What he deprecated was that at that early stage in the working of the Act, the Board of Education should be asked to stereotype the relations of local authorities for the secondary schools within their area.

At the annual conversazione of the Medical Society of London on Monday, Sir Isambard Owen delivered the annual oration, taking for his subject "The Future of London Medical Education." After contrasting the interest displayed by Continental States in scientific research and public education with the indifference evinced towards them by the generality of Englishmen, and pointing out that this indifference could only be a passing phase, due to patent historical causes, he expressed the hope that the reports of the Mosely Commissioners, with their marvellous tale of recent educational progress in America and the fabulous amounts of public and private money freely lavished upon it, would at last awaken attention here to the backward state of things at the heart of the British Empire. Of all forms of higher education, he submitted, none could lay greater claim to public support than medical education. The unendowed London schools had still to carry the entire burden of the preliminary academic training of their students —a task which elsewhere was now undertaken by endowed universities and university colleges. Until the reconstitution of the University of London, no practicable way out of the difficulty could be seen. Sir Isambard Owen then detailed the plan which the university had adopted of establishing a public institute within its bounds and under its direct control to undertake teaching in physics, chemistry, biology, anatomy, and physiology for the purposes of medical students. Including buildings, the institute would cost about 375,000*l.* to establish. As the State declined all responsibility for professional education in England, the university could only look to enlightened private liberality. Wealthy men in London capable of being fired by emulation of Transatlantic gifts to education should make this modest benefaction their peculiar care.

SOCIETIES AND ACADEMIES.

London.

Anthropological Institute, April 26.—Sir Thomas Holdich, K.C.M.G., &c., in the chair.—Prof. W. **Ridgeway** delivered a lecture on the origin of jewellery. Prof. Ridgeway holds that the objects employed in modern jewellery had their origin in magical properties attributed to them and not in æsthetic, although the æsthetic reason for wearing them undoubtedly influenced the wearers at an early stage (see Nature, October 29, 1903, vol. lxviii. p. 636).